

DETAILED ACTION

Responsive to Board or Patent Appeals and Interferences (BPAI) decision rendered 3/10/2010. Claims 1-28 are pending. Claims 3,6,7,13-21,24-26 are withdrawn. Claims 1,2,4,5,8-12,22,23,27,28 are examined herein.

Election/Restrictions

The restriction requirement mailed 9/1/2005 remains in force. Applicant has elected a C1-C20 alkyl, aralkyl or aryl phosphonium salt for the species of nucleic acid binding moiety; silica for the species of solid support and a hydrolytically cleavable linker on 12/3/3005.

Priority

This application has a filing date of 11/17/2003. Applicant makes no claims for the benefit of any prior-filed application.

Reversed Rejection

The rejection of claims 1,2,4,8,11 under 35 USC 103(a) as being unpatentable over Hughes in view of Lough et al has been reversed by the BPAI decision of 3/10/2010.

New Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1,9,11,12 are rejected under 35 U.S.C. 102(b) as being anticipated by
Alhambra et al (2001 Tetrahedron Letters 42:6675-6678).

The claimed subject matter per claim 1 is drawn to a solid phase for binding
nucleic acids comprising:

a solid support portion comprising a matrix comprising at least one of silica, glass, insoluble synthetic polymers, or insoluble polysaccharides,

a nucleic acid binding portion for attracting and non-covalently and non-sequence
specifically binding nucleic acids
wherein the nucleic acid binding portion comprises at least one of a ternary
sulfonium group, a quaternary ammonium, or a quaternary phosphonium group $PR_3^+ X^-$, and
a cleavable linker portion linking the nucleic acid binding portion to the solid
support.

Alhambra et al et al teach, throughout the document and especially the title and
first paragraph following the abstract on p 6675, a method for parallel (combinatorial)
synthesis of tertiary amines on a resin which includes the step of cleaving a quaternary
ammonium ion from an acrylic ester traceless linker.

Alhambra et al teach in reference 12 on p 6677, the resin for the synthesis is
made from Wang resin, reading on the insoluble synthetic polymer of claim 1. In
scheme 1, Alhambra et al teach preparation of quaternary ammonium groups on said
acrylic ester-resin, providing a nucleic acid binding portion for attracting and non-
covalently and non-sequence specifically binding nucleic acids wherein the nucleic acid
binding portion comprises a quaternary ammonium group of claim 1, since positively
charged quaternary ammonium groups inherently bind the negatively charged

phosphodiester backbone of nucleic acids. Also shown in scheme 1 of Alhambra et al, said quaternary ammonium group is cleavable, thus providing the cleavable linker portion linking the nucleic acid binding portion to the solid support of claim 1.

Said quaternary ammonium linked to the acrylic ester reads on the ester of claim 12 and is inherently hydrolytically cleavable in that all esters may be saponified with base, reading on claim 11 (elected species). Said acrylic ester comprises one or more connecting portions, reading on claim 9.

With regard to the preamble of claim 1 drawn to a solid phase for binding nucleic acids, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Claim 1,2,4,5,9,11,12,27 are rejected under 35 U.S.C. 102(b) as being anticipated by **Igawa et al** (US Patent 4728556).

Igawa et al teach, throughout the document and especially the last two lines of claim 5 preparation of a polymethacryloxyethyltributyl phosphonium chloride, which reads on the insoluble synthetic polymer of claims 1 and 27. The tributyl phosphonium (elected species) group on the methacrylate backbone reads on a nucleic acid binding portion for attracting and non-covalently and non-sequence specifically binding nucleic acids wherein the nucleic acid binding portion comprises a quaternary phosphonium group of claims 1 and 27, since positively charged quaternary phosphonium groups

inherently bind the negatively charged phosphodiester backbone of nucleic acids. Said quaternary phosphonium chloride reads on claims 2,4,5 and 27 when X is Cl⁻; R is C-4 (butyl). Said quaternary phosphonium chloride linked to a methacryl ester reads on the ester of claims 12 and 27 and is inherently hydrolytically cleavable in that all esters may be saponified with base, reading on the cleavable linker portion of claims 1,11 and 27 (elected species). Said methacryl ester comprises one or more connecting portions, reading on claim 9.

With regard to the preamble of claim 1 drawn to a solid phase for binding nucleic acids, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Thus, the claims as set forth above are anticipated.

New Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1,9,11,12 and 8,10 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Alhambra et al** (2001 Tetrahedron Letters 42:6675-6678) in view of **Barrett** (WO 97/32892).

Alhambra et al is relied on as above.

While Alhambra et al do not teach: silica (claim 8) or a magnetically responsive portion (claim 10); **Barrett** teaches, throughout the document and especially p 1 lines 1-16 and figure 2, a composite for combinatorial chemistry comprising silica (elected species), reading on claim 8 and magnetite, reading on claim 10.

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to utilize the composite of Barrett for combinatorial synthesis of tertiary amines per Alhambra et al.

One of ordinary skill in the art would have been motivated to use the composite of Barrett for combinatorial synthesis of tertiary amines per Alhambra et al because it circumvents to the difficult problem of identifying of the materials, information that is lost during preparation thereof, as discussed by Barrett on p 5 lines 7-11 and followed up on

p 6 lines 12-14. Furthermore, a preferred embodiment of Barrett on p 9 line 5 includes cleavable linkers, i.e. like the acrylic ester traceless linker of Alhambra et al.

One of ordinary skill in the art would have had a reasonable expectation of success in applying the composite of Barrett toward preparing tertiary amines in the manner of Alhambra et al because each reference concerns combinatorial solid-phase synthesis. In other words, the method of Alhambra falls squarely in the scope of technology suited for the apparatus developed by Barrett.

Thus the claimed invention was within the ordinary skill in the art to make and use at the time the claimed invention was made and was as a whole, *prima facie* obvious.

New Claim Rejections - 35 USC § 112

The following is a quotation of the **second** paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1,4,5,8-12,22,23,28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP

§ 2172.01. The omitted structural cooperative relationships concern R and X with regard to the quaternary phosphonium group, for which no definition for is provided.

As currently written, the metes and bounds of the claims are unascertainable. Therefore, claim 1 and all dependent claim (with the exception of claim 2 where R and X are subsequently defined) are rejected under 35 USC 112, second paragraph.

In accordance with MPEP 2173.02: If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int 'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993).

With regard to claim 28, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present

instance, claim 28 recites the broad recitation of X is any anion in line 6, and the claim also recites X is Bromide in the structure shown which is the narrower statement of the range/limitation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER M. GROSS whose telephone number is (571)272-4446. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached on 571 272 0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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